

spinulosa, and have concluded that whilst their Diploxyloid organisation differs from that of the Lepidodendra, it justifies the conclusion that Sigillariae were not lycopodiaceous but gymnospermous plants. But I have already shown that several indisputable Lepidodendra have precisely the same organisation. Hence I contend that Brongniart's reasons for separating these plants have no existence, and consequently his conclusions must be abandoned; M. Grand' Eury, forgetting this part of my work, and only remembering that I have also described the bark of a true Syringodendroid Sigillaria, and shown that it is identical in every feature with the corresponding tissue in Lepidodendra, says that I have arrived at my conclusion "par des faits isolés d'après l'analogie de l'écorce, et non par des exemples complets réunissant les caractères extérieurs aux caractères intérieurs." How, in the face of my published memoirs, my friend could make so erroneous a statement, I am at a loss to conceive.

I should have felt it necessary to have subjected the volumes under consideration to an incisive criticism on these and some similar points, were it not that he kindly allows me to quote from some letters which I have received from him. In these communications he says:—"Les points sur lesquels nous différons sont précisément ceux que je n'ai pas étudiés." Referring to facts which I have observed, he adds: "Comme je n'avais pas ces faits pour me guider, j'ai conclu d'après ce que je connaissais bien, et je ne suis pas fain de conclure que je suis trompé; dans ce cas nous aurions dans les Sigillaires et les Lepidodendrons des cryptogames excessivement élevées en organisation; si élevées qu'ils formaient, en quelque façon, une classe intermédiaire entre ces plantes et les Gymnospermes." "L'Association presque constante des macrospores avec le débris des Sigillaires est en faveur de vos conclusions." Quite in accordance with the above remarks are the following observations which the author makes in his volumes: "Il est au moins curieux que, à part le corps vasculaire, les autres parties des Sigillaires soient semblables aux parties correspondantes des Lepidodendrons." This is perfectly true with the exception that the vascular portions are less exceptional than M. Grand' Eury's remarks imply. The Sigillarian stem is merely that of *Lepidodendron Harcourtii*, with an additional exogenous vascular zone interposed between that of the Lepidodendron and its investing cortex; and which I find in other true Lepidodendra. If all the plants of the coal-measures which possess a similar exogenous zone are to be transferred from the cryptogamic to the phanerogamic group, there will be few cryptogams left in the carboniferous rocks beyond *Lepidodendron Harcourtii* and the ferns. M. Grand' Eury concludes his notice of the Sigillariae by a remark which I fully endorse: "Seulement je crains d'avoir tiré des conséquences trop complètes de ces indices insuffisants, dont je n'aurais peut-être alors même dû parler que pour éveiller l'attention des observateurs sur une solution possible du plus important problème de la paléontologie végétale."

Having thus indicated some very important points respecting which I am compelled to differ from M. Grand' Eury, I can with the sincerest truth again express my sense of the value of this new contribution to the study of the carboniferous flora, and of the praiseworthy perseverance with which the author

has laboured for many years in collecting his materials. The most prominent fact which the work reveals is the remarkable abundance of the Cordaites in the coal-measures of Central France, compared with what we see in England. In some districts, as M. Grand' Eury informs us, the coal is almost entirely composed of their débris. I have met with nothing like this in Great Britain, but it is in strict accordance with what we know of the distribution of living plants, that whilst similar types may be expected to be met with over wide geographical areas, some forms will predominate in one region, whilst in other localities different types will prevail; hence the materials out of which coal has been found must have been widely different at these various spots.

The plates with which the above work is illustrated are extremely beautiful, as is usually the case with the productions of the French lithographers.

W. C. WILLIAMSON

OUR BOOK SHELF

Annals do Observatorio do Infante D. Luiz. Magnetismo Terrestre. Lisboa, 1876.

THIS part of the *Annals* of the Lisbon Observatory is a continuation of those noticed in NATURE, vol. xiii. p. 301. The results for the magnetic declination are carried forward from 1867 to 1871, while some include the means from 1858 to 1875. This is the case for the secular change and annual variation. Mr. Capello found previously that the north end of the declination magnet approached the north at the rate of 5°91 yearly (1858-1868). The results he now divides into two series, 1858 to 1866, with a rate of 5°46, and 1866 to 1875, with a rate of 7°64 yearly.

The yearly means are deduced from observations at 8 A.M. and 2 P.M. Mr. Capello has also shown that the diurnal law of disturbance appears to be different at Lisbon in different years of the decennial period.¹ In this case, even if two observations daily were otherwise sufficient to give accurate means, or means strictly comparable from year to year, the varying effect of the disturbance on the observations at the two hours mentioned would of itself interfere with this comparability. It is probably for these reasons that the yearly means at Lisbon do not appear to show the small decennial inequality in the secular movement first indicated by me in 1857, and afterwards discovered by Hansteen and Lloyd.

Mr. Capello has repeated discussions for the magnetic disturbances with the increased materials in his possession. He had observed in a preceding number of the *Annals*, that many observations which were considered disturbed (that is to say, which differed from the means for the hours by 2°26 or more) really belonged to diurnal variations which were regular, only larger than usual; and it was pointed out in NATURE (in the notice cited above) that one cause of these excessive deviations would be found in the superposed lunar actions. Mr. Capello now finds that a great majority of these quasi-solar disturbances are rather to be considered due to the moon. This conclusion induces me to believe that if Mr. Capello had the necessary aid to perform the calculations for the lunar diurnal variations for each month, and for different positions of the moon, as well as for other investigations, the Lisbon observations could not fail to add many important scientific results to those already published.

JOHN ALLAN BROUN

Incidents in the Biography of Dust. By H. P. Malet. (London: Trübner and Co.)

THE first impression one gets of this book is that of a

kind of nightmare. It begins by personifying dust and makes "us dusts" utter a great deal of incoherent talk which changes somehow into the voice of the writer himself, who by and by fades into Prof. Tyndall, then into "a weekly paper, *Punch*," then through Hugh Miller and the Holy Scriptures into the familiar tones of Mr. Henry Woodward, F.R.S., who gives way to the dusts again, and so on. The first impression, too, deepens upon further perusal. One never can be quite sure who is speaking; whether the "we" is the editorial pronoun or marks the utterances of the personified dust-motes. Sometimes, indeed, by a kind of feeble and perhaps, unconscious pun, it means both the author and "us dusts;" as where a sentence begins (p. 107), "Of all the authorities we have ever rested on, Sir Charles Lyell has described mountain formation most accurately." Or again: "Mrs. Somerville is a favourite authoress; we seldom find a protracted rest upon her volumes." The writer seems to have made a very hearty meal on all kinds of miscellaneous geological and other scientific and literary food. The variety and amount of the viands have been too much for him. Hence the wild speculations, the grotesque theories, the pell-mell rush of changing subject through the 272 pages of this curious but dreary volume. So completely has the nightmare taken possession of the author that in his frenzy he forgets the composition of the very air he breathes, and sententiously announces that while "the earth consists of air, water, and dust," the "air is composed chiefly of oxygen, hydrogen, and carbonic-acid gases." We would venture to suggest a good application of oxygen and hydrogen in the form of a shower-bath as a corrective. The book closes most appropriately with a spiritualistic séance, at which the *dramatis personæ* are a Medium, Spirit of Socrates, and Dust. If the author would discard all this "plain language," as he is facetiously pleased to call it, and tell us in simple straightforward English what it is all about, we should be prepared calmly to listen to him, but no more such "Biographies of Dust!"

Chemical Physics. By N. N. Lubavin. First fascicule. St. Petersburg, 1876, 346 pp., in 8vo. (Russian.)

THE author has given in a handbook a description of the various physical phenomena which, without belonging to the true domain of chemistry, are nevertheless involved in all chemical processes, and which can adequately be described as physico-chemical. These phenomena, of the highest importance for the student of chemistry who is interested in the philosophy of his science, are dealt with at length by the author in a very lucid and plain style. Without discussing advanced theories, M. Lubavin, in this first fascicule (the second being in the press) gives us only facts, and in a condensed form much useful information. He has carefully read what has been published in this department in France and Germany, but is not very familiar with our English works, except through German or French translations.

Enumeracion de los Vertebrados Fósiles de España. Por Don Salvador Calderon. (Madrid: T. Fortanet, 1877.)

THIS is a reprint from the *Anal. de la Soc. Espan. de Hist. Nat.*, tom. v., of Señor Calderon's valuable catalogue of the vertebrate fossils hitherto discovered in Spain, with an introduction and accompanying remarks. As the catalogue and an abstract of the introduction to it have been published in the *Quarterly Journal* of the Geological Society of London during the present year, it will not be necessary for us to do more than to call attention to the appearance of the work in its more complete form. Some interesting questions are opened up by the author concerning the distribution of several interesting Miocene forms such as *Sivatherium*, *Hyænartos*, and *Hipparium*.

* See also Proc. Roy. Soc. (March, 1876.) Vol. xxiv. p. 273.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.

The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Museum Reform

EVERY one who puts faith in museums as educational engines must be grateful to Prof. Boyd Dawkins for the article on this subject in the number of *NATURE* for May 31. That reform is pressingly needed in most of our provincial museums is a proposition almost beyond question; but how such reform can be best effected is a subject open to any amount of discussion. The primary difficulty in organising a museum is usually a difficulty of finance. Money, which measures all things, measures the curator's power of procuring glass cases and suitable specimens. Where, then, the resources of a museum are very limited, the greatest amount of good will probably be effected by confining attention to the formation of local collections. Such work, being restricted within a narrow sphere, may be done thoroughly, even in the poorest museum. Yet it is work which will be valued by every true student of science. Prof. Blackie, in his "Self Culture," gives excellent advice when he says: "In order to assist in forming habits of observation in this age of locomotion I should advise young men never to omit visiting the local museums of any district, as often as they may have an opportunity; and when there to confine their attention generally to that one thing which is the most characteristic of the locality." Now it often happens that the things most characteristic of the locality are hardly thought worth exhibiting, and are precisely the things that we do not find in a provincial museum. Only last week I had occasion to visit a museum of thoroughly old-fashioned type, and to my surprise I found that the mineral industries of the neighbourhood, though of great importance, were absolutely unrepresented, whilst unlabelled curiosities collected from every quarter of the globe were heaped together in defiance of all principles of classification. It is true there is great temptation for a curator to display a little of everything, and a specimen from the Antipodes is no doubt regarded as a greater curiosity than a specimen from the neighbouring hills. But if a small museum is to have any educational value worth naming, its aims should be restricted, at least in the early stages of its development. Many museums undoubtedly teach too little by attempting to teach too much.

Perhaps the chief cause of unsatisfactory arrangement in so many museums is to be found in the difficulty of curatorship. Most museums naturally take their complexion from those who have charge of them; if the curator, for example, is a good entomologist, the collection of insects will be good; and so on. A general museum, indeed, needs a curator just a trifle less than omniscient. Even where each department is under charge of some honorary specialist, it by no means follows that the greatest educational value is got out of the collections. It seems to me that it would be an advantage, wherever practicable, to establish some kind of connection between the museum and the nearest college or other educational centre; assuming, of course, that it is a centre of liberal education where science asserts its proper position. Just as lectures teach principally through the ear, so museums teach through the medium of the eye; and those who have had most experience in oral teaching will probably be best qualified to assist in the oversight of an educational museum.

Another direction in which most museums imperatively need reform is in the simple matter of labelling. Too often the visitor leaves without carrying away much information, simply because he is unable to interpret what he has seen. A curator can therefore hardly be too free in the use of descriptive labels. Large labels, no doubt, occupy a good deal of space, and this can be ill spared in a crowded collection. Nevertheless, I believe it is far better to exhibit only half the number of specimens, fully telling their own tales, than to cram the cases with specimens unnamed or only meagrely described. If a museum is to be of real value educationally, it must be made as far as possible its own interpreter.

F. W. RUDLER
Scientific Club, Savile Row

I HOPE ventilation of this subject in the columns of *NATURE* will direct attention to the necessity of more systematic arrange-